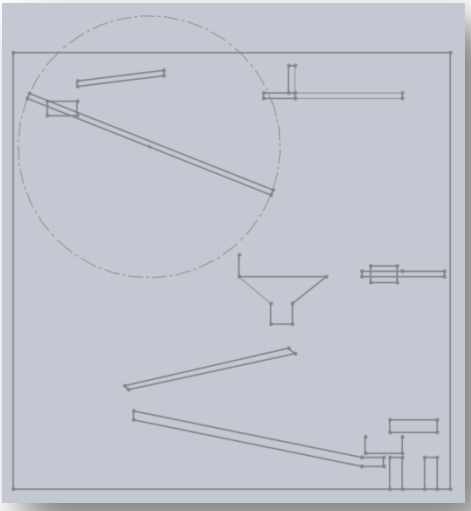
A Rube Goldberg Experience

Mike Siegel, Isaac Wenger, Yiwen Zhao

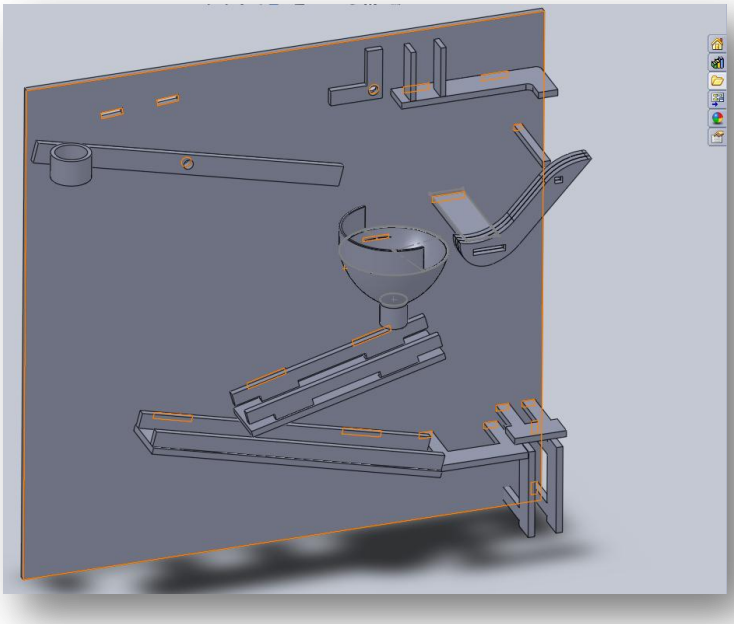
Given the prompt of creating a toy or game, anything seemed possible from music boxes to Jenga. The design process was a learning experience in group work, brainstorming, and time management. This was the first project in which students were encouraged to work together, therefore creating a mixing pot of ideas and techinques unique to each individual. For our group, the various styles of using Soldworks was a benefit, some were better at preparing things for a press fit, while other were good at modelling for the 3D printer. When brainstorming, it became clear that everyone's talents could be used and the project could span many media. After eliminating ideas like puzzles or things that we found were unrealistic in their complexity (like rubiks cubes), building a Rube Goldberg machine was settled upon. This idea appeased everyone since it involved a number of mechanisms all of which needed to be designed in different ways.

Shown to the right is our preliminary sketch:



Although it included many of our final elements, at this point the toy seemed like a long shot. How were we going to keep the ball on the track and how would each piece be supported? Was there going to be a horizontal base with vertical supports or vice versa? The key to answering these questions all seemed to be: try them all.

Below is a more developed model of the previous sketch. Things changed based on practicality. For example, it was impossible to predict how a ball would land after a 5 inch drop into a bucket and how the catapulted second ball would fly into the funnel. This problem was solved by using a ramp instead that would release and catch the ball closer but still incorporate the trackless motion of the ball. Another change we made, although not shown, was that we decided it would be much more efficient to attach the dominoes to hinges so that they wouldn't ruin any future progress of the ball's path. Despite the tremendous amount of consideration we took in advance there were still some questions that could not be answered for certain before it was actually built. For



example, would the ball actually be strong enough to push the sliding block into the PEZ and eject it?

This and much more was answered during the trial and error phase. Some things that needed to be revised included the dowel, which were originally going to be screws. In order to allow for the lever to rotate as needed, the dowels needed to be sanded to the exact dimension where they would simultaneously press fit and allow spin. This was not an easy job. Additionally, we had to devise a way to make the vertical backboard stand up, which was not a consideration when we were simply modeling it on a computer without the influence of gravity. However, much of the design worked as we had anticipated, a feat that was accomplished by careful planning. It seems that the daunting task of making the Rube Goldberg machine was almost as fun as getting to use the toy itself.